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ABSTRACT

A set of computer programs was developed to support instruction in an introduction to education course for prospective teachers. The programs provide teacher education students with examples of various uses of the microcomputer to support classroom instruction. The instructional programs represent three types: drill and practice, tutorial and dialogue, and information storage and retrieval. The "Teacher Classroom Management Strategies" program was designed to give students practice in identifying teacher stategies that reinforce desirable classroom behavior or reduce the frequency of off-task behavior. The "Secondary Mainstreaming Materials Inventory" is a set of programs designed to store information on print and non-print materials that contain information relative to mainstreaming handicapped students. The "Quiz Maintainance Programs" were designed to store multiple choice or true-false items on a file, select items from that file to construct a test, and create a "Student Quiz Program" that presents selected items to the student, accepts the student answer, and stores the student name and number of correct choices. A copy of this program is appended, and step-by-step procedures are described for each of the programs. (JD)

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64th ANNUAL MEETING

New Orleans

Using Microcomputers to Support Instruction in an Introduction to Education Course

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Using Microcomputers to Support Instruction in an Introduction to Education Course

Introduction

In the past, computers were too expensive for most elementary and secondary schools to use as instructional resources. With the introduction of microcomputers, cost as the primary obstacle to computer use in the classroom is no longer as important. "There are now microcomputers which are low enough in cost to make them feasible for education and training" (Schuller, 1982, p. 423). As educators became more aware of possible instructional applications for the computer and as more instructional software became available, the purchase and use of microcomputers by school systems increased dramatically. "More computers have been installed in classrooms during the past 18 months than in the entire preceding decade" (Business Week, 1981, p. 66). Recent surveys have found that between 36.2% (Ingersoll, 1983) and 53% (CSOS Report, 1983) of all teachers indicate that at least one microcomputer was available in their school. The most recent Gallup Poll indicates that 72% of the respondents thought that schools should require instruction in computer training (Gallup, 1983). With cost decreasing each year while capability is increasing, it is expected that microcomputers will become a major instructional tool in many elementary and secondary classrooms.

Microcomputers can be used for instruction either as a medium of delivery or as the topic itself. The results of a survey conducted in 1980 indicate the most frequent educational use of microcomputers in elementary and secondary

schools was to provide students with an understanding of computer concepts - computer literacy (Goor, 1981). This also appears to be the most common use of microcomputers in teacher preservice and inservice training programs (Friedman, 1982). It seems that even when computer systems and instructional materials are proliferating at an amazing rate, the primary application of microcomputers in teacher education is focused on teaching about the computer.

One direction that colleges of education must take if computer literacy skills are to be developed in teacher preservice and inservice programs is that "Faculty should be encouraged to integrate CBI (Computer Based Instruction) into their own classroom teaching, so that teacher trainees can have first-hand knowledge of CBI from a learner's perspective" (Anderson, 1983, p. 8). If we expect prospective teachers to utilize the microcomputer as a mode of instructional delivery, it would appear that more courses at the college level, particularly in teacher preparation programs, must utilize the microcomputer as a mode of instructional delivery.

Purpose

The purpose of this paper is to describe a set of computer programs that were developed to support instruction in an introduction to education course. These programs provide teacher education students with examples of various ways the microcomputer can be used to support their own classroom instruction when they become teachers. In addition, the programs focus on topics included in the textbook used by all instructors of the course - Introduction to Education (Orlosky, 1982).

The Course

Approximately 300 students are enrolled in the introductory education course (Exploring the Profession) each semester. These students are primarily

second-semester freshman or first-semester sophomores. Approximately six percent of the students own their own personal computer, 18 percent have had some experience with computers during their elementary or secondary schooling, and 46 percent have had some experience with computers while in college.

The content of the course is similar to many introduction to education courses that incorporate a field experience in the elementary and secondary schools. Students spend one-half day per week for five weeks in an elementary school setting and one-half day per week for five weeks in a secondary school setting. A variety of activities are planned during this experience that require students to collect, organize, and interpret data relating to the total school system. The students also assist teachers in a variety of instructional activities. A campus seminar is held once-a-week analyzing teacher roles, introducing students to the field of education, and discussing classrooms in settings such as urban, suburban, and rural.

The Programs

There are four major types of instructional programs that can be used on microcomputers: drill and practice, tutorial and dialogue, simulation and games, and information storage and retrival (Schuller, 1982). Programs described in this paper have been written for each of these areas except for simulation and games. The programs were developed on the Apple IIe with 48K of memory and are written in Applesoft.

The program Teacher Classroom Management Strategies was designed to give students practice in identifying teacher strategies that reinforce desirable classroom behavior or reduce the frequency of off-task behavior. A flowchart of the program is presented in Figure 1.

The program begins by presenting on the TV monitor, definitions of specific teacher behaviors. An example of the definitions that are displayed

is presented in Figure 2. The complete list of teacher behaviors includes:

1. Specific Praise
2. General Praise
3. Privileges
4. Teacher Attention
5. Concrete Rewards
6. Specifying Desirable Pupil Behavior
7. Discussing Deviant Pupil Behavior
8. Reinforce-Ignore
9. Desist
10. Suggest Alternate Behavior
11. Concurrent Praise
12. Describe Desirable Behavior

When the student has completed the reading of the definitions of specific teacher strategies, the program presents a short dialogue between a teacher and pupils at the bottom of the screen. The student is asked to identify the strategy being exhibited and to enter its code from the list provided at the top of the screen. Two examples of what is presented to the student are presented in Figures 3 and 4.

If the student correctly identifies the teacher strategy being used, the program presents a positive reinforcer such as GOOD at the bottom of the screen. If the student incorrectly identifies the teacher strategy being used, the program defines the strategies and then repeats the same dialogue. Once the student correctly identifies the strategy, the program continues on to the next dialogue. At the end of the program, the student is informed of the number of incorrect choices that were made. The present program contains 19 examples and requires approximately 15 minutes for the student to complete.

The Secondary Mainstreaming Materials Inventory is a set of programs designed to store information on print and non-print materials that contain information relative to mainstreaming handicapped students. The following information is stored for each item

1. Title
2. Editor(s)
3. Author(s)
4. Publisher
5. Audience
6. Medium
7. Location
8. Abstract
9. Descriptors

One program is used to maintain the inventory file. It creates the file by reading specific information from the keyboard and storing this information as a record on a random access, disk file. The program can also add records to the file, delete records from the file, and change records that are currently stored on the file. It has the capability of printing any or all records on the TV screen or on a printer. An example of a printed record is presented in Figure 5.

A second program is used by students to search for specific records on the file. Students can locate materials by defining the type of Medium desired (article, book, videocassette, . . .) and by providing one or more Descriptors (behaviorally disturbed, counseling, tutoring, testing, . . .) that describe the content of the material. Materials in the file are classified by one of eighteen different Medium and by one or more of eighty-nine different discriptors.

Students define the materials that they want by entering statements such as the following: M16 AND D18 OR D74
This would locate those materials that are Resource Guides (Medium 16) and deal with Emotionally Disturbed (Descriptor 18) or Learning Disabled (Descriptor 74). The student can then obtain a list of the titles for those materials with their location or can get a complete record of the material printed on the printer. At the present time, records for 163 different sets of materials are stored in the file.

The program Quiz Maintainance Programs was designed to store multiple choice or true false items on a file, select items from that file to construct a test, and create a Student Quiz Program that presents the selected items to the student, accepts the student answer, and stores the student name and number of correct choices. A copy of this program is attached to the back of this paper.

The program begins by presenting a MENU to the user. Descriptions of the alternatives in the MENU are presented below.

1. Information. This provides the user with a description of the program including the input the user must provide and the output that can be expected from the program.

2. Create Item File. This creates a new item file, adds items to existing item files, changes items in existing files, or returns the user to the MENU. The one restriction on each item is that they cannot be more than 18 lines with more than 40 characters or spaces in any line. Items that contain more than 18 lines will not fit on the TV screen.

3. Print Items. This prints a copy of each item that is stored in any item file.

4. Create Quiz. This creates the Student Quiz Program. It allows the user to provide a three line title for the quiz and a statement of the directions for taking the quiz. The user can select any number of items, in any order, from any item file for inclusion in the test. The Student Quiz Program is stored on a disk along with files containing the test title, the directions, the selected items, and the correct answers. In addition, a file is created in which student names and scores are stored.

5. Check Results. This provides information stored on the disk about student scores. It creates a frequency distribution using the scores of all students who took the test and provides an alphabetical listing of all students with their raw score, percentile rank, and Z-score. This information can be on the TV screen or printed on the printer. A copy of a printout is presented in Figure 6.

6. Quit. This ends the program.

The Student Quiz Program presents the items to the student. It is protected so that students cannot stop the program. If the student hits the RESET key, the program starts over from the beginning. If any errors

are detected during the program run or when the program is finished, the program ends. When the program ends, anything the student enters including DOS commands cause the program to begin running from the beginning. A sample run for a quiz containing two items is presented in Figure 7.

Concluding Remarks

There still remain a number of improvements that need to be made and bugs to remove from each program described in this paper. We plan to incorporate these changes and to build new programs in the future. In addition, many of the logistical problems associated with having many students actively involved on a small number of microcomputers have not been adequately solved. If you have any questions concerning the programs and how they are used in the course, want more complete descriptions of any of the programs, or would like a copy of a program, please write to:

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Bowling Green State University
Bowling Green, Ohio 43403

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Figure 1. Flowchart
Teacher Classroom Management Strategies

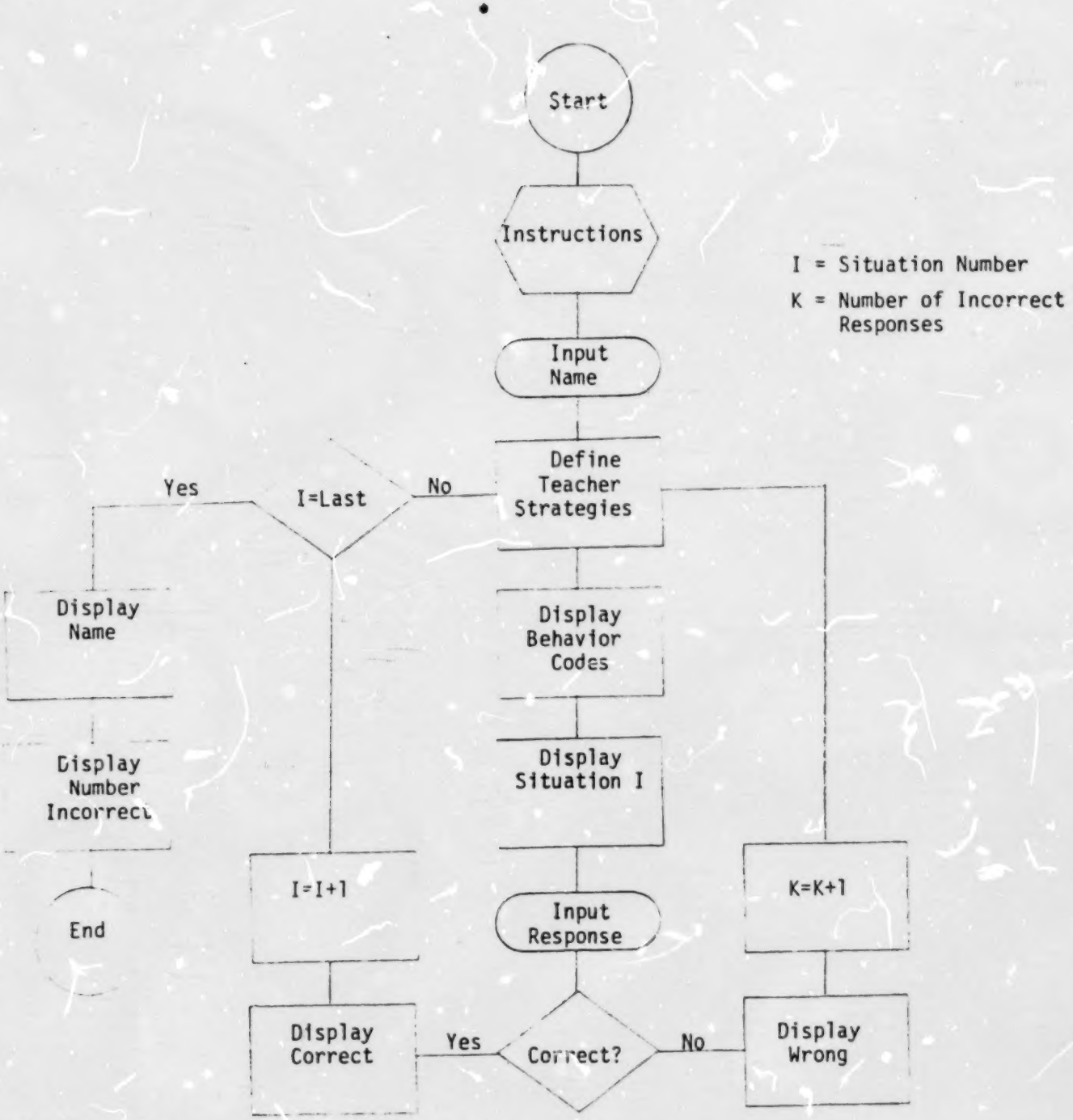
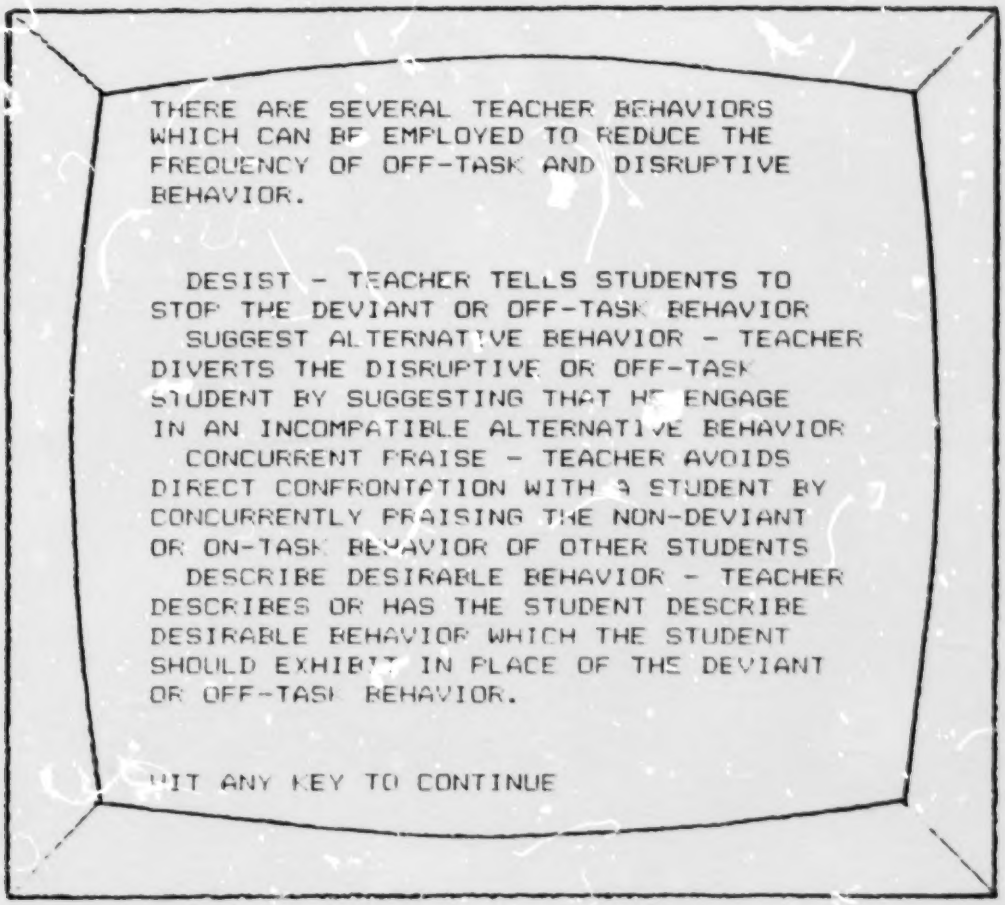
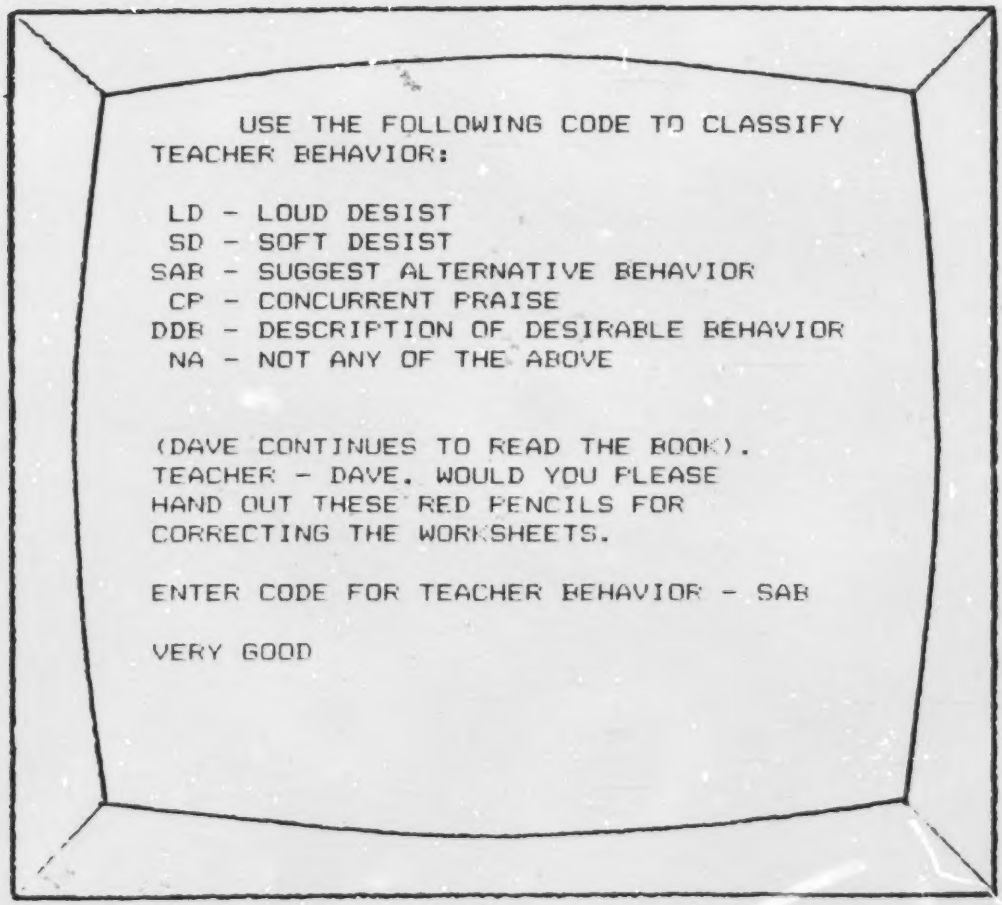


Figure 2. Example Teacher Strategies
Teacher Classroom Management Strategies


THERE ARE SEVERAL TEACHER BEHAVIORS WHICH CAN BE EMPLOYED TO REDUCE THE FREQUENCY OF OFF-TASK AND DISRUPTIVE BEHAVIOR.
DESIST - TEACHER TELLS STUDENTS TO STOP THE DEVIANT OR OFF-TASK BEHAVIOR
SUGGEST ALTERNATIVE BEHAVIOR - TEACHER DIVERTS THE DISRUPTIVE OR OFF-TASK STUDENT BY SUGGESTING THAT HE ENGAGE IN AN INCOMPATIBLE ALTERNATIVE BEHAVIOR
CONCURRENT PRAISE - TEACHER AVOIDS DIRECT CONFRONTATION WITH A STUDENT BY CONCURRENTLY PRAISING THE NON-DEVIANT OR ON-TASK BEHAVIOR OF OTHER STUDENTS
DESCRIBE DESIRABLE BEHAVIOR - TEACHER DESCRIBES OR HAS THE STUDENT DESCRIBE DESIRABLE BEHAVIOR WHICH THE STUDENT SHOULD EXHIBIT IN PLACE OF THE DEVIANT OR OFF-TASK BEHAVIOR.
HIT ANY KEY TO CONTINUE

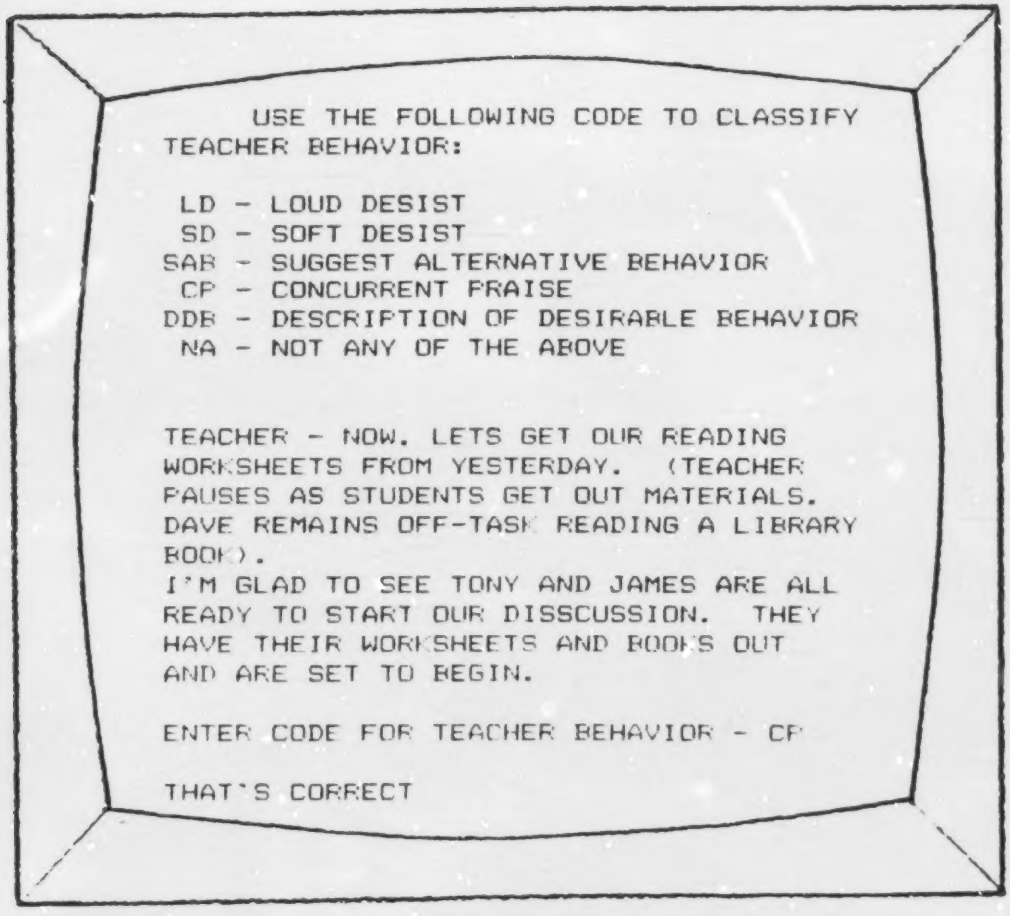
XXX - Inverse Letters

Figure 3. Example of Dialogue
Teacher Classroom Management Strategies


USE THE FOLLOWING CODE TO CLASSIFY
TEACHER BEHAVIOR:
LD - LOUD DESIST
SD - SOFT DESIST
SAB - SUGGEST ALTERNATIVE BEHAVIOR
CP - CONCURRENT PRAISE
DDB - DESCRIPTION OF DESIRABLE BEHAVIOR
NA - NOT ANY OF THE ABOVE
(DAVE CONTINUES TO READ THE BOOK).
TEACHER - DAVE. WOULD YOU PLEASE
HAND OUT THESE RED PENCILS FOR
CORRECTING THE WORKSHEETS.
ENTER CODE FOR TEACHER BEHAVIOR - SAB
VERY GOOD

XXX - Inverse Letters

Figure 4. Example of Dialogue
Teacher Classroom Management Strategies


USE THE FOLLOWING CODE TO CLASSIFY TEACHER BEHAVIOR:
LD - LOUD DESIST
SD - SOFT DESIST
SAB - SUGGEST ALTERNATIVE BEHAVIOR
CP - CONCURRENT PRAISE
DDB - DESCRIPTION OF DESIRABLE BEHAVIOR
NA - NOT ANY OF THE ABOVE
TEACHER - NOW. LETS GET OUR READING WORKSHEETS FROM YESTERDAY. (TEACHER PAUSES AS STUDENTS GET OUT MATERIALS. DAVE REMAINS OFF-TASK READING A LIBRARY BOOK).
I'M GLAD TO SEE TONY AND JAMES ARE ALL READY TO START OUR DISSCUSSION. THEY HAVE THEIR WORKSHEETS AND BOOKS OUT AND ARE SET TO BEGIN.
ENTER CODE FOR TEACHER BEHAVIOR - CP
THAT'S CORRECT

XXX - Inverse Letters

Figure 5. Example of Record
Secondary Mainstreaming Materials Inventory

(On Following Page)

RECORD NUMBER 1

TITLE:

ASSESSING CHILDREN WITH SPECIAL NEEDS: A PRACTICAL GUIDE FOR THE USE OF PSYCHOLOGICAL, BEHAVIORAL, AND EDUCATION MEASURES

EDITOR(S):

AUTHOR(S):

THOMAS MAHAN, ALINE MAHAN

PUBLISHER:

HOLT, RINEHART, AND WINSTON, INC.: NEW YORK,N.Y., 1981, PP. 229

AUDIENCE:

TEACHER EDUCATORS, REGULAR AND SPECIAL EDUCATION TEACHERS

MEDIUM:

BOOK

LOCATION:

CLINICAL LAB MPM 0003

ABSTRACT:

THE TEXT IS DIVIDED INTO THREE SECTIONS: PART 1 (CHAPTERS 1-3) EXAMINES THE "STATE OF THE ART" AND INVOLVES THE READER IMMEDIATELY IN THE PROCESS OF USING ASSESSMENT DATA FOR DECISION-MAKING PURPOSES; PART 2 EXAMINES SPECIFIC INSTRUMENTS, STRESS IS PLACED ON THE KIND OF INFORMATION GENERATED AND HOW IT CAN BEST BE USED, CASE STUDIES ARE PROVIDED; PART 3 TRIES TO TIE IT TOGETHER FROM THE PERSPECTIVE OF THE TEACHER.

DESCRIPTORS:

ASSESSMENT
EVALUATION
INSTRUMENTS
TESTING

Figure 6. Frequency Distribution
Quiz Maintaintance Programs

****

N = 68
THE MEAN = 10.4411765
THE STANDARD DEVIATION = 1.53759125
KR #21 = 0

****

SCORE	FREQUENCY	PR	Z-SCORE
12	19	86	60
11	20	57	54
10	15	32	47
9	7	15	41
8	3	8	34
7	2	4	28
6	1	2	21
5	1	1	15
4	0	0	8
3	0	0	2

****

STUDENT	SCORE	PR	ZSCORE
[redacted]	12	86	60
[redacted]	10	32	47
[redacted]	11	57	54
[redacted]	11	57	54
[redacted]	9	15	41
[redacted]	12	86	60
[redacted]	11	57	54
[redacted]	11	57	54
[redacted]	11	57	54
[redacted]	10	32	47
[redacted]	11	57	54
[redacted]	6	2	21
[redacted]	11	57	54
[redacted]	9	15	41
[redacted]	10	32	47
[redacted]	12	86	60
[redacted]	10	32	47
[redacted]	10	32	47

Figure 7. Sample Run
Student Quiz Program

```
          FIRST EXAMINATION
              EDFI 202
              FALL  83


WHAT IS YOUR NAME?  KATHY LARKEY


================================

DIRECTIONS - CHOOSE THE BEST ANSWER.


ITEM# 1
EMULATION CALLED FOR TEACHING THROUGH
THE USE OF


A.  PUNISHMENT
B.  COMPETITION
C.  INDEPENDENT STUDY
D.  DISCUSSION


YOUR ANSWER?  B

================================

DIRECTIONS - CHOOSE THE BEST ANSWER.


ITEM# 2
HORACE MANN PROMOTED EDUCATIONAL IDEAS
HE OBSERVED WHILE VISITING


A.  FRANCE
B.  ENGLAND
C.  DENMARK
D.  PRUSSIA


YOUR ANSWER?  D

================================

KATHY LARKEY
YOUR SCORE WAS 2 RIGHT OUT OF 2
REMOVE THE QUIZ DISK FROM THE
DISK DRIVE.

TURN OFF THE APPLE.
TURN OFF THE TV MONITOR.

BYE
```

```
LIST

  1  REM        QUIZ MAINTAINANCE PROGRAMS
  2  REM        ROBERT REED / KATHY LARKEY
  3  REM        OCTOBER,1983
 20  DIM ITEM(100)
 30  PRINT  CHR$ (4);"MA FILES 7"
200  HOME
205  PRINT : PRINT : PRINT "------------ MENU ------------": PRINT
210  PRINT "------------------------------
220  PRINT : PRINT "     1.  INFORMATION
221  PRINT "     2.  CREATE ITEM FILE"
222  PRINT "     3.  CREATE QUIZ"
223  PRINT "     4.  PRINT ITEMS"
224  PRINT "     5.  CHECK RESULTS"
225  PRINT "     6.  QUIT"
230  PRINT : PRINT "------------------------------"
240  HTAB (20): FLASH : PRINT "WHICH?";: NORMAL : GET A$
250 A =  VAL (A$): IF A < 1 OR A > 6 THEN  HOME : PRINT "ENTER 1, 2, 3, 4,
     5, OR 6": FOR I = 1 TO 1000: NEXT I: GOTO 205
300  ON A GOTO 400,500,600,700,800,900
310  GOTO 250
400  REM  ====================
401  REM  INFORMATION
402  REM  ====================
405  HOME
410  PRINT "NO INFORMATION AVAILABLE"
415  FOR I = 1 TO 1000: NEXT I: GOTO 205
500  REM  ====================
501  REM   CREATE ITEM FILE
502  REM   ====================
510  HOME : PRINT : PRINT : PRINT "DO YOU WISH TO:": PRINT
520  PRINT "------------------------------"
521  PRINT : PRINT "     1.  CREATE A NEW ITEM FILE"
522  PRINT "     2.  ADD AN ITEM"
523  PRINT "     3.  CHANGE AN ITEM"
524  PRINT "     4.  RETURN TO MENU"
525  PRINT : PRINT "------------------------------
530  HTAB (20): FLASH : PRINT "WHICH?";: NORMAL : GET A$
540 A =  VAL (A$): IF A < 1 OR A > 4 THEN  HOME : PRINT "ENTER 1, 2, 3, OR
     4": FOR I = 1 TO 1000: NEXT I: PRINT : PRINT : GOTO 520
550  ON A GOTO 560,570,580,200
560  HOME : INVERSE : PRINT "THIS OPTION WILL DESTROY THE FILE YOU
     NAME.": PRINT : PRINT "ARE YOU SURE YOU WANT TO CREATE A NEW        I
     TEM FILE?": NORMAL : INPUT A$: IF A$ <  > "YES" GOTO 510
561  GOSUB 1000: GOSUB 1100
562  GOSUB 1200: GOSUB 1300
563  HOME : PRINT "ITEM  ?;" IS STORED.": PRINT : PRINT
564  GOSUB 1400
565  PRINT : PRINT : INPUT "CORRECT CHOICE?";A$
566  GOSUB 1500
567  HOME : INPUT "ENTER ANOTHER ITEM?";A$: IF A$ = "YES" GOTO 562
568  PRINT  CHR$ (4);"CLOSE"      CHR$ (4)
569  GOTO 510
570  HOME : PRINT "THIS OPTION ADDS ITEMS TO AN EXISTING": PRINT "FILE.  I
     S THIS WHAT YOU WANT?": INPUT A$: IF A$ <  > "YES" GOTO 510
571  GOSUB 1000: GOSUB 1600
572  GOTO 562
580  HOME : PRINT "THIS OPTION CHANGES AN ITEM": PRINT "IS THIS WHAT YOU W
     ANT?": INPUT A$: IF A$ <  > "YES" GOTO 510
581  GOSUB 1000
582  PRINT : PRINT "WHICH ITEM DO YOU WISH TO CHANGE?"
583  INPUT R
```

BEST COPY AVAILABLE

```
584  GOSUB 1700
585  HOME : PRINT "THIS IS ITEM ";R: PRINT : PRINT : GOSUB 1400
586  PRINT : PRINT : PRINT "IS THIS THE ITEM?": INPUT A$: IF A$ < > "YES"
     THEN  HOME : GOTO 582
587 R = R - 1: GOTO 582
600  REM  ====================
601  REM  CREATE QUIZ
602  REM  ====================
605  HOME
610  PRINT "THIS OPTION CREATES A QUIZ.": PRINT "IS THAT WHAT YOU WANT?": INPUT
     A$: IF A$ < > "YES" GOTO 200
615  HOME : GOSUB 1000
616 DP = 1:DQ = 2: IF DR = 2 THEN DP = 2:DQ = 1
617  HOME : PRINT "PLACE THE DISK CONTAINING THE": PRINT "ITEM FILE IN DRI
     VE - ";DP
618  PRINT : PRINT : PRINT "PLACE THE DISK TO CONTAIN THE": PRINT "STUDENT
      QUIZ IN DRIVE - ";DQ: PRINT "THIS DISK MUST BE INITIALIZED."
619  PRINT : PRINT : FLASH : PRINT "HIT ANY KEY TO CONTINUE";: NORMAL : GET
     A$
620  HOME : PRINT "TYPE IN TEST HEADING.": PRINT "LIMIT IS THREE LINES.": PRINT
     "HIT RETURN FOR BLANK LINE."
621  PRINT : PRINT : INPUT "FIRST LINE: ";T1$: INPUT "SECOND LINE: ";T2$: INPUT
     "THIRD LINE: ";T3$
622  GOSUB 1750
626  PRINT : PRINT : INPUT "IS THIS THE WAY IT SHOULD LOOK?";A$
627  IF A$ < > "YES" GOTO 620
630  HOME : PRINT "TYPE IN DIRECTIONS."
631  PRINT "WARNING - DO NOT USE COMMAS."
632  PRINT : PRINT : INPUT "DIRECTIONS: ";T4$
633  GOSUB 1750: PRINT : PRINT : GOSUB 1770: PRINT T4$
634  PRINT : PRINT : INPUT "IS THIS THE WAY IT SHOULD LOOK?";A$
635  IF A$ < > "YES" GOTO 630
636  PRINT  CHR$ (4);"OPEN TITLE$,D";DQ
637  PRINT  CHR$ (4);"WRITE TITLE$"
638  PRINT T1$: PRINT T2$: PRINT T3$: PRINT T4$
639  PRINT  CHR$ (4);"CLOSE TITLE$": PRINT  CHR$ (4)
640 N = 1
641  HOME : PRINT "ENTER THE NUMBER FOR EACH ITEM"
642  PRINT "IN THE ORDER YOU WANT THEM"
643  PRINT "TO APPEAR ON THE TEST."
644  PRINT "ENTER 0 (ZERO) AFTER THE LAST ITEM"
650  PRINT : PRINT : PRINT "INPUT THE RECORD NUMBER FOR ITEM:"
651  PRINT N;"  ";: INPUT A
652  IF A = 0 GOTO 660
653 ITEM(N) = A:ITEM(0) = ITEM(0) + 1:N = N + 1
654  GOTO 651
660  HOME : FLASH : HTAB (10): VTAB (14): PRINT "I AM WORKING": NORMAL
668  PRINT  CHR$ (4);"OPEN ITEM$,D";DQ: PRINT  CHR$ (4);"DELETE ITEM$": PRINT
      CHR$ (4);"OPEN ITEM$"
669  PRINT  CHR$ (4);"OPEN ANSWER$": PRINT  CHR$ (4);"DELETE ANSWER$": PRINT
      CHR$ (4);"OPEN ANSWER$"
670  PRINT  CHR$ (4);"CLOSE"
671  FOR I = 1 TO N - 1
672 R = ITEM(I):DR = DP
673  GOSUB 1700: GOSUB 1800
675  PRINT  CHR$ (4);"APPEND ITEM$,D";DQ
676  PRINT  CHR$ (4);"WRITE ITEM$"
677  PRINT C$: PRINT D$: PRINT  CHR$ (4)
678  PRINT  CHR$ (4);"APPEND ANSWER$"
679  PRINT  CHR$ (4);"WRITE ANSWER$"
680  PRINT A$: PRINT  CHR$ (4)
681  NEXT I
685  PRINT  CHR$ (4);"OPEN STUDENT$,D";DQ
686  PRINT  CHR$ (4);"CLOSE STUDENT$"
687  PRINT  CHR$ (4);"OPEN STUDENT$"
690  PRINT  CHR$ (4);"OPEN DQUIT,D";DP
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```
691. PRINT .CHR$ (4);"WRITE DOIT"
692  PRINT "LOAD QUIZ,D0"
693  PRINT "SAVE HELLO,D0"
695  PRINT  CHR$ (4): PRINT  CHR$ (4);"EXEC DOIT"
696  PRINT  CHR$ (4)
697  GOTO 200
700  REM  ====================
701  REM   PRINT ITEMS
702  REM  ====================
710  HOME : PRINT "THIS OPTION PRINTS ITEMS ON THE PRINTER."
720  PRINT : PRINT  PRINT : FLASH : PRINT "BE SURE PRINTER IS TURNED ON."
     : NORMAL
730  PRINT : PRINT : PRINT "HIT ANY KEY TO CONTINUE";: GET A$
740 R = 1: ONERR  GOTO 790
750  GOSUB 1000
751  GOSUB 1700: GOSUB 1800
755  PRINT  CHR$ (4): PRINT  CHR$ (4);"PR#1"
761  PRINT "ITEM # ";R: PRINT : GOSUB 1400
762  PRINT : PRINT : PRINT "CORRECT ANSWER = ";A$
770  PRINT : PRINT : FOR I = 1 TO 30: PRINT "=";: NEXT I: PRINT
775  PRINT  CHR$ (4): PRINT  CHR$ (4);"PR#0"
780 R = R + 1: GOTO 751
790  PRINT  CHR$ (4);"PR#1": PRINT : PRINT : PRINT "END OF ITEM FILE"
791  PRINT  CHR$ (4);"PR#0": GOTO 200
800  REM  ====================
801  REM  CHECK RESULTS
802  REM  ====================
805  HOME
810  PRINT "PLACE STUDENT TEST DISK ": PRINT "IN DRIVE #2"
820  PRINT : PRINT : INVERSE : PRINT "HIT ANY KEY WHEN READY": NORMAL
830  GET A$
840  PRINT  CHR$ (4);"RUN I-SCORE,D2"
900  HOME
910  PRINT "PROGRAM FINISHED"
920  END
1000  REM  ====================
1001  REM  INPUTS NAME OF FILE
1002  REM  ====================
1010  HOME : PRINT "WHAT IS THE NAME OF THE ITEM FILE?": INPUT F$
1020  VTAB (5): PRINT "WILL THE ITEM FILE DISK": PRINT "BE IN DRIVE # OR 2
     ?": INPUT "ENTER 1 OR 2. ";DR: PRINT
1030  IF DR < 1 OR DR > 2 THEN  HOME : GOTO 1020
1040  RETURN
1100  REM  ====================
1101  REM  DELETES AND OPENS FILE
1102  REM  ====================
1120  PRINT  CHR$ (4);"OPEN ";F$;",D";DR;",L512"
1125  PRINT  CHR$ (4);"DELETE";F$
1126  PRINT  CHR$ (4);"OPEN";F$",L512"
1130  PRINT  CHR$ (4);"WRITE";F$;",R0"
1140  PRINT 0
1145  PRINT  CHR$ (4);"CLOSE"
1150  PRINT  CHR$ (4);"OPEN";F$;" ANSWERS,L5"
1160  PRINT  CHR$ (4);"DELETE";F$;" ANSWERS"
1161  PRINT  CHR$ (4);"OPEN";F$;" ANSWERS,L5"
1162  PRINT  CHR$ (4);"WRITE";F$;" ANSWERS,R0"
1170  PRINT 0
1180  PRINT  CHR$ (4);"CLOSE": PRINT  CHR$ (4):R = 0
1190  RETURN
1200  REM  ====================
1201  REM  READS ITEM
1202  REM  ====================
1210 R = R + 1
1220  HOME : PRINT "TYPE IN ITEM ";R: PRINT
1221  PRINT "AS YOU WANT IT TO APPEAR ON THE TEST.": PRINT "REMEMBER TO HI
     T CTRL E WHEN FINISHED."
```

```
1222  PRINT : PRINT "DO NOT PUT ITEM NUMBER IN FRONT OF STEM."
1223  PRINT : PRINT
1230 C$ = "":D$ = "":I = 0
1240  GET A$: PRINT A$;
1241  IF A$ = "" THEN C$ = C$ + A$: GOTO 1290
1242  IF A$ =  CHR$ (13) THEN C$ = C$ + "&": GOTO 1250
1243  IF A$ =  CHR$ (44) OR A$ =  CHR$ (59) THEN C$ = C$ + "@": GOTO 1250
1244 C$ = C$ + A$
1250 I = I + 1: IF I > 255 THEN D$ = "": GOTO 1260
1251  GOTO 1240
1260  GET A$: PRINT A$;
1261  IF A$ = "" THEN D$ = D$ + A$: GOTO 1290
1262  IF A$ =  CHR$ (13) THEN D$ = D$ + "&": GOTO 1270
1263  IF A$ =  CHR$ (44) OR A$ =  CHR$ (59) THEN D$ = D$ + "@": GOTO 1270
1264 D$ = D$ + A$
1270 I = I + 1: IF I > 511 GOTO 1280
1271  GOTO 1260
1280  HOME : PRINT "TOO MANY CHARACTERS - START OVER": GOTO 1200
1290  RETURN
1300  REM  ====================
1301  REM  STORE ITEM
1302  REM  ====================
1310  PRINT  CHR$ (4);"OPEN ";F$;",D";DR;",L512"
1320  PRINT  CHR$ (4);"WRITE";F$;",R0"
1321  PRINT R
1330  PRINT  CHR$ (4);"WRITE";F$;",R";R
1331  PRINT C$: PRINT D$
1340  PRINT  CHR$ (4);"CLOSE": PRINT  CHR$ (4)
1350  RETURN
1400  REM  ====================
1401  REM  PRINT ITEM
1402  REM  ====================
1410 I = 1
1420 A$ =  MID$ (C$,I,1)
1421  IF A$ = "" GOTO 1490
1422  IF A$ = "&" THEN A$ =  CHR$ (13)
1423  IF A$ = "@" THEN A$ =  CHR$ (44)
1430  PRINT A$;
1440 I = I + 1: IF I > 255 GOTO 1450
1441  GOTO 1420
1450 I = 1
1460 A$ =  MID$ (D$,I,1)
1461  IF A$ = "" GOTO 1490
1462  IF A$ = "&" THEN A$ =  CHR$ (13)
1463  IF A$ = "@" THEN A$ =  CHR$ (44)
1470  PRINT A$;
1480 I = I + 1: GOTO 1460
1490  RETURN
1500  REM  ====================
1501  REM  STORE ANSWER
1502  REM  ====================
1510  PRINT  CHR$ (4);"OPEN ";F$;" ANSWERS,D";DR;",L5"
1520  PRINT  CHR$ (4);"WRITE";F$;" ANSWERS,R0"
1521  PRINT R
1530  PRINT  CHR$ (4);"WRITE";F$;" ANSWERS,R";R
1531  PRINT A$
1540  PRINT  CHR$ (4);"CLOSE": PRINT  CHR$ (4)
1550  RETURN
1600  REM  ====================
1601  REM  OPENS FILE
1602  REM  ====================
1610  PRINT  CHR$ (4);"OPEN ";F$;",D";DR;",L512"
1620  PRINT  CHR$ (4);"READ";F$;",R0"
1621  INPUT R
1630  PRINT  CHR$ (4)
1640  RETURN
```

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1700  REM  ====================
1701  REM  RETRIEVES ITEM
1702  REM  ====================
1710  PRINT  CHR$ (4);"OPEN ";F$;",D";DR;",L512"
1720  PRINT  CHR$ (4);"READ";F$;",R";R
1721  INPUT C$
1722  INPUT D$
1730  PRINT  CHR$ (4)
1740  RETURN
1750  REM  ====================
1751  REM  PRINTS TEST HEADING
1752  REM  ====================
1760  HOME : PRINT : PRINT
1761  HTAB ( INT ((40 -  LEN (T1$)) / 2)): PRINT T1$
1762  HTAB ( INT ((40 -  LEN (T2$)) / 2)): PRINT T2$
1763  HTAB ( INT ((40 -  LEN (T3$)) / 2)): PRINT T3$
1764  RETURN
1770 T4$ = "DIRECTIONS - " + T4$
1772 M = 40
1773 L =  LEN (T4$): IF L <  = M GOTO 1790
1776 N = M - 39: FOR I = M TO N STEP  - 1:M$ =  MID$ (T4$,I,1): IF M$ = "
     " GOTO 1780: NEXT I
1777  NEXT I
1780 L$ =  LEFT$ (T3$,I):R$ =  RIGHT$ (T4$,L - I)
1782  FOR J = I + 1 TO M:L$ = L$ + " ": NEXT J
1784 T4$ = L$ + R$
1785 M = M + 40
1786  GOTO 1775
1790  RETURN
1800  REM  ====================
1801  REM   RETRIEVES ANSWERS
1802  REM  ====================
1810  PRINT  CHR$ (4);"OPEN ";F$;" ANSWERS,D";DR;",L5"
1820  PRINT  CHR$ (4);"READ ";F$;" ANSWERS,R";R
1830  INPUT A$
1840  PRINT  CHR$ (4)
1850  RETURN
2000 R = 1
2005  ONERR  GOTO 2060
2010  GOSUB 1000
2020  GOSUB 1800
2025  PRINT "R= ";R
2030  PRINT "A$= ";A$
2040  GOSUB 1700
2041  PRINT "C$= ";C$
2042  PRINT "D$= ";D$
2043  GET X$
2044 R = R + 1
2050  GOTO 2020
2060  PRINT "R= ";R
2070  END
3000 R = 0
3004 Y$ = "": ONERR  GOTO 3060
3005 F$ = "EXAM"
3010  PRINT  CHR$ (4);"OPEN ";F$;" ANSWERS,L5"
3020  PRINT  CHR$ (4);"READ ";F$;" ANSWERS,R";R
3030  INPUT Z$
3040 Y$ = Y$ + Z$
3050 R = R + 1: GOTO 3020
3060  PRINT "Y$=/";Y$;"/"
3070  END
```